

## FACTORS CAUSING MATH ANXIETY ON JUNIOR HIGH STUDENTS: A CASE OF AN UPLAND ACADEMIC COMMUNITY

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### ABSTRACT

*Math anxiety is a widespread, worldwide problem affecting all age groups. The study aimed to determine the factors causing math anxiety among the Junior High students of Mantalongon National High School as basis for a proposed intervention plan. The study utilized a descriptive-quantitative method, adopting Math Experience Questionnaires as tool. Descriptive statistics were employed along with identified inferential statistical treatment such as chi-square in the analysis of data.*

*Findings of the study revealed that the three factors causing math anxiety were environmental, individual, and behavioral. Moreover, these factors have a significant relationship with the age profile and scholastic rating of the respondents. This means that an intervention plan be made focusing on these two variables.*

**KEYWORDS:** Anxiety, Environmental, Individual, Mantalongon & National High School

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### 1. INTRODUCTION

The development of math skills is crucial for adequate functioning in academic and professional settings as well as in daily life. A factor that has been shown to negatively influence performance and acquisition of math skills is math anxiety (Endler & Edwards, 2016). Math anxiety is a widespread, worldwide problem affecting all age groups. Based from the findings of the Programme for International Student Assessment (PISA, 2018), approximately 93 percent of adult US-Americans indicate that they experience some level of math anxiety. Estimations are that approximately 17 percent of the US-American population suffers from high levels of math anxiety. In a sample of adolescent apprentices in the United Kingdom, approximately 30 percent of the study participants reported high math anxiety, and a further 18 percent were at least somewhat affected.

In the Philippines based from the findings of the Programme for International Student Assessment (PISA, 2018) the results are dismal. Test results for the country's 15-yearsold randomly tested as a group scored the country lowest among the 79 countries tested in Reading literacy, and the second lowest in Science and Mathematics literacy.

When faced with difficult Math problems, these students fill their heads with negativism and focuses on it, distracting them from attempting to work through the problem in front of them which resulted to students' lower levels of achievement in Mathematics (Sparks, 2011). In fact, based on some informal interviews conducted, many students of Mantalongon National High School claim that they do not like Mathematics for they believe that doing Math can cause negative emotions like fear of failure and this belief harms their ability to perform.

With the high prevalence of math anxiety in society and the long-lasting effects on math performance, it is important to study the relation between math anxiety and math performance in young children. The study aimed to determine factors causing math anxiety among grade 7 students of Mantalongon National High School as basis for an intervention plan for mathematics teaching.

## 2. METHODOLOGY

### 2.1. Study Area

The study was conducted in Mantalongon National High School, Mantalongon, Dalaguete, Cebu (Figure 1). The study area has a coordinate of 9.813438N; 123.462432E, located 13 kilometres west of the town of Dalaguete, and 84 kilometres southeast of Cebu City. The said school was also the workplace of the main author.



Figure 1: Location Map of the Research Environment  
(<https://www.google.com/search?q=map+of+cebu+province>)

## **2.2. Respondents**

The number of respondents were determined using the Sloven's formula. There were 114 respondents selected out of 159 students from the three sections of grade 7 level. Grade 7 students were the one enrolling mathematics among the higher-grade level based from K-12 curriculum of the Department of Education in the Philippines.

## **2.3. Data Analysis**

The study utilized the descriptive-quantitative method, adapting the Math Experience Questionnaire. The significant relationship between the profile of the respondents and the factors causing math anxiety were analyzed using chi-square coefficient of contingency.

## **3. RESULTS AND DISCUSSIONS**

### **3.1 Factors Causing Math Anxiety (Environmental Factor)**

The environmental component was made up of the physical surroundings around the individual that contain potentially reinforcing stimuli, including people who were present (or absent). The environment influences the intensity and frequency of the behavior, just as the behavior itself, can have impact on the environment.

The findings of the study showed that student's attention was distracted by the noise and foul odor in the learning environment. The findings affect the concentration of the respondents towards learning Mathematics. On the other way around, bullying and crowded classroom has also an impact towards learning Mathematics. This affirmed the study of Sutter (2006) which states that a healthy learning climate is commonly understood integral to the success of all learners, but may particularly significant for Math anxiety learners. This means that if the learning environment was not suitable for learning, it can have a negative effect on the performance of the students.

According to Ashcraft & Faust (2009) math anxiety causes a decline in performance in math achievement and proficiency scores of the students. Taking the initiative to reduce or eliminate those types of environments can have a significant impact on the students who are affected and thus underestimated in terms of their true ability.

### **3.2. Factors Causing Math Anxiety (Individual Factor)**

The individual component includes all the characteristics that have been rewarded in the past. Personality and cognitive factors play an important part on how a person behaves, including all of the individual's expectations, beliefs, and unique personality characteristics.

In this study it revealed that the students will get worried if they were unable to comply the outputs given by the teacher and also during exams and quizzes which may have an impact on the student's way of learning Mathematics. On the other hand, skipping Math classes and the feeling of nervous and discomfort has also an impact towards Math anxiety.

Feng et al., (2014) stated that the feeling of math anxiety constitutes a formidable block to numeracy and create cognitive constraints on individuals that causes them to avoid evaluating numerical information and making day-to-day decisions that involve computations. Outside of academics, math anxiety can have large and detrimental consequences in student's daily lives. Many students hate math, it makes them nervous, and it causes innumeracy in day-to-day decisions. Math-anxious students avoid choosing alternatives that require multiple steps in numerical computation, and thus choose the suboptimal alternative. Essentially, when the students need to pay attention to the information given, the pressure to

perform the task was intense, and students must still grapple with worries associated with math, leading to avoidance of alternatives requiring computations.

### **3.3. Factors Causing Math Anxiety (Behavioral Factor)**

Behavioral component emphasizes the role of environmental factors in influencing behavior, to the next inclusion of innate or inherited factors. It was concerned with observable stimulus-response behaviors, and states that all behaviors were learned through interaction with the environment.

The findings in the study showed that the teacher's rules being imposed inside the classroom like sit and listen may affect the student's behavior and may result to depression that may affect the student's performance during exams and quizzes. As a result, the student tends to copy answers from the classmates especially in dealing difficult problems in Mathematics. Listening to the teacher and choosing other things not related to the subject has also an impact to math anxiety.

According to Finlayson (2014), a major cause of anxiety is the traditional classroom environment where students often work individually, there is a strict adherence to affixed curriculum, the instructor assumes an authoritative role, and there is one form of assessment via testing. Math is a cumulative discipline, where lack of achievement at an early age can make it difficult, if not impossible, to fully understand more advanced math topics.

### **3.4. Relationship between the Profile of the Respondents and the Environmental Factor**

The computed chi-square for age vs. environmental factor was 9.85, the coefficient of contingency (C) was 0.28, and the tabulated value was 7.74 greater than the critical value of 1.98 at 0.05 level of significance. Thus, there was a significant relationship between the age and the environmental factor.

For the computed chi-square of scholastic rating vs. environmental factor was 2.86, while the coefficient of contingency (C) was 0.16, and the tabulated value was 1.93 less than the critical value of 1.98 at 0.05 level of significance. Thus, there was no significant relationship between the scholastic rating and the environmental factor.

The result implied that age has something to do with the environmental factors like out of focus because of a noisy environment, destructive and foul odor surroundings. The student tends to be out of concentration in studying Mathematics. It would follow that if the student was not able to follow through the discussion of the teacher, he will not be able to make it during exams, quizzes or output making. Thus, it may result to a poor performance. In order to minimize this, possibly students can be grouped according to their age brackets and will be placed in a suitable environment. This is revealed in the study of Sutter (2006) that a healthy learning climate is commonly understood integral to the success of all learners. This means that if the learning environment was not suitable for learning, it can have a negative effect on the performance of the students.

### **4.5. Relationship between the Profile of the Respondents and the Individual Factor**

The computed chi-square for age vs. individual factor was 16.22, the coefficient of contingency (C) was 0.35, and the tabulated value was 4.86 greater than the critical value of 1.98 at 0.05 level of significance. Thus, there was a significant relationship between the age and the individual factor.

For the computed chi-square of scholastic rating vs. individual factor was 3.29, while the coefficient of contingency (C) was 0.17, and the tabulated value was 2.15, greater than the critical value of 1.98 at 0.05 level of

significance. Thus, there was a significant relationship between the scholastic rating and the individual factor.

The result implied that age and scholastic rating may be affected by the individual factors like worrying not to complete every output in Mathematics and not doing well in Math test, also cannot recall on some Mathematics concepts. Some students may belong to a grade level not suited to their age bracket like balik-aral. They find it hard to relate to their classmates who are younger than their age. With this, they find it boring listening to the teacher feeling that they do not belong to the group. It follows that the student was not able to comply expected outputs and not performing well during Math tests. As a result, scholastic rating was now affected. Thus, math anxiety prevails.

Scarpello (2007) states that a high reliance on high-stakes tests has reinforced the negative attitudes associated with math and increased the anxiety levels of students by turning math into a high-risk activity. Studies have shown that students who perform poorly on math assessments have a full understanding of the math concepts being tested; however, their anxiety prevents them from correctly solving mathematical problems. Students' anxiety with math and avoidance of math may be attributed to elements of the classroom environment (Sparks et al, 2011).

### **3.6. Relationship between the Profile of the Respondents and the Behavioral Factor**

The computed chi-square for age vs. behavioral factor was 12.69, the coefficient of contingency (C) was 0.32 and the tabulated value was 4.36, which was greater than the critical value of 1.98 at 0.05 level of significance. Thus, there was a significant relationship between the age and the behavioral factor.

to cope up with the lesson. And so, during exams and quizzes, they choose to copy answers from classmates for the sake of compliance. As a result, students may have poor scholastic rating. Unfortunately, many individuals have grown accustomed to hearing and accepting statements from family, peers, and acquaintances that address a lack of skills or abilities to perform in math. Many of these persons suffer from a fixed mindset concerning the ability to learn mathematics; they see math as a discipline in which getting the correct answer to problems is the most important measure of learning (Dowker et al, 2016).

## **4. CONCLUSION**

Mathematics anxiety can have detrimental effects on students such as reducing performance in mathematics, causing mathematics avoidant behavior, and ultimately preventing students from realizing their true potential.

Thus, the result of the study shows that the variables involved such as profile of the respondents such as age and scholastic rating and the factors such as environmental, individual, and behavioral contribute to the development of Math anxiety among students since there is a significant relationship among variables. With this, mathematics anxiety among grade 7 students of Mantalongon National High School is evident.

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